



# KARO ECHO Newsletter

## KARO ECHO

Serving the communities  
of El Cerrito and  
Kensington, California

**Web:** [www.karoecho.net](http://www.karoecho.net)

**Facebook:**  
[KARO ECHO facebook](#)

**Email:** [info@karoecho.net](mailto:info@karoecho.net)

## Important Frequencies

KE Primary: 146.415 MHz  
Weekly Net, Thurs. 1900

KE Secondary: 146.475 MHz

4Cs Repeater: 145.110 MHz  
(TX down 600 with PL 82.5)

## Monthly Meetings

In-person meetings

2<sup>nd</sup> Monday of each month  
7:00 pm

(online via Zoom for now)

Arlington Park Clubhouse,  
1120 Arlington Blvd,  
El Cerrito, CA

The next meetings are:

Dec 14<sup>th</sup>, 2020

Jan 11<sup>th</sup>, 2020

Meeting minutes are on  
[the website](#) in the past  
events page.

## What's New

### KARO ECHO Monthly Meeting, December 14th, 1900 — **ONLINE VIA ZOOM**

The monthly KARO ECHO meeting will once again be held using the Zoom online meeting app, at the usual time, 1900, Monday November 14th. Look for the link to join in a KARO ECHO email from Howdy KE6BEE. We will hold elections for club officers and have a presentation about digital modes for emergency communications, particularly "WiFi" mesh networking in ham portions of the 2.4 and 5.8GHz bands.

### Elections for KARO ECHO officers

Elections for KARO ECHO officers will be held during the December 14th meeting. The Nomination Committee consisted of Marian KC6OBK, Natalie KM6UCF, Tom KN6UBUY, Annette KK6SWK, Jamuel KM6HBO, and Don NI6A. Thank you to the nomination committee for their work. They are reporting the following nominations for the four elected offices:

President: Hal KK6NDF

Vice President: Howdy KE6BEE

Secretary: Tom KN6BUY

Treasurer: Larry KK6GIO

Only dues paying members can vote in elections. Please help support KARO ECHO by renewing your membership dues now.

Thank you to Natalie KM6UCF who has done a fantastic job as the club secretary. She has stepped down from that position for the coming year. Thanks Natalie.

### Digital Modes for Emergency Communications

The last few pages of this newsletter provide some background and links for the upcoming presentation on digital modes for emergency communications. This presentation is partly motivated by the news that the [SFWEM](#) mesh network recently [received \\$100k grant from ARDC](#). The [ARDC recently got a windfall of \\$108M](#) from selling off 1/4 of their IP4 addresses to Amazon. They have invested this nest egg and plan to issue grants of roughly \$1-5M annually, primarily off the interest. [Here is a page with some information about applying](#) for these grants.

**LOCAL NETS****KARO ECHO NET**

146.415 MHz Simplex

Thursday eve, immediately  
after the West Contra Costa  
RACES Net, but never before  
1900 hours local time.

**West Contra County  
ACS/RACES Net**

145.110 MHz repeater

(TX down 600 with PL 82.5)

Thursday: 1845 local time

**Contra Costa County HF  
EmComm/RACES Net**

3893 KHz

Thursday: 1835 local time

**American Red Cross of the  
Bay Area (ARCBA)**

WW6BAY Repeater

443.975 MHz

TX +5 MHz, PL 100 Hz

Wednesday: 2000 local time

**BOARD OFFICERS**

President: Hal KK6NDF

Treasurer: Larry KK6GIO

Secretary: Natalie KM6UCF

Outreach Manager:

Annette, KJ6SWK

Emergency Coordinator:

(also newsletter and  
net coordinator)

Howdy KE6BEE

Webmaestro: Rob K6RJM

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**What's New *(continued)***

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**Neighborhood nets and Communication Hub Activities**

The first Wednesday of the month has a lot of radio activity in the area.

**West county EmComm net out of Richmond at 11 am** (following the Richmond  
siren test) on FRS/GRMS simplex (Channel varies: 17, 19)

**East Richmond Heights**, ham operators check-in at 1845 on Walt's WA6DUR  
repeater 442.150 +5 offset and PL tone 107.2Hz.

**EC4 (central El Cerrito Hills)** CERT Net, Ch. 2 simplex (462.5875), at 1845

**EC9 (north El Cerrito Hills)** CERT Net, Ch. 15 simplex (462.550), at 1900

EC9 reported 15 check-ins for their Oct. 4th net

**East Richmond Heights, Ready-2-React Net**, Ch. 7 simplex (462.7125), at 1930

**Richmond simulated EOC net**, first Thursdays at 1030, on three simplex  
frequencies in this order: 147.450, 441.000, 223.400

**New - Albany Radio Net**, Wed. (weekly) 1900 on Ch.19 [Albany Radio groups.io](http://AlbanyRadiogroups.io)

[Coordination of neighborhood FRS/GMRS frequencies can be found here.](#)

**New Elmering Online Resource**

A new online elmering resource has been established, the [elmer@karoecho.net](mailto:elmer@karoecho.net)  
email and google group. Anyone can email this address with a technical ques-  
tion about ham radio or emergency communications procedure. Or, just ask  
how to get started. Knowledgeable KARO ECHO members will provide an-  
swers and discussion. The emails can be browsed as a later resource by using  
the google group web interface.

**Welcome New Hams**

New El Cerrito licenses issued: none in past month

New Kensington licenses issued: none in past month

**Important! - Membership Renewals are due at the beginning of the year**

Please renew your KARO ECHO membership dues for the coming year. You  
can pay Treasurer Larry KK6GIO (check made out to KARO ECHO). Mail to  
P.O. Box 2025, El Cerrito, CA, 94530-3651. \$30 for individual membership, or  
\$40 for family membership.

**Action - Contribute to this Newsletter**

Content for this newsletter is always welcome. Anyone with events or other  
content suggestions please send them to the newsletter editor Howdy KE6BEE  
[ke6bee@arrl.net](mailto:ke6bee@arrl.net)

## Activities

### Weekly Net Control Rotation

Thanks go out to the volunteer stations who have been taking turns as Net Control Stations (NCS) each Thursday. This rotation has been working very well and everyone has been doing a great job. The regular NCS roster has 9 operators. We have one opening as an opportunity for others to fill in. Please volunteer to give it a try. [Download the new Net Script for NCS operators.](#)

Below are the current scheduled dates for each operator. The [KARO ECHO google calendar](#) also has these assignments and can be found at the bottom of the events page. Add to your electronic calendar By pressing the "+GoogleCalendar" button in the lower right.

Net control is a skill that many operators should have and regularly practice. Please contact Howdy [ke6bee@arrl.net](mailto:ke6bee@arrl.net) if you are interested in taking a net control assignment.

**Note:** Updated dates for the coming year below. After the next Thurs. net on 12/17, we will have two weeks off because of conflicts with holidays and our weekly nets will return on 1/7/2021.

Callsign	Name	Assigned Dates (skipped: 11/26/2020, 11/25/2021, 12/24/2020, 12/31/2020)						
KE6BEE	Howdy Goudey	9/17/2020	11/19/2020	2/11/2021	4/15/2021	6/17/2021	8/19/2021	10/21/2021
KK6NDF	Hal Graboske	9/24/2020	12/3/2020	2/18/2021	4/22/2021	6/24/2021	8/26/2021	10/28/2021
KM6HBO	Jamuel Starkey	10/1/2020	12/10/2020	2/25/2021	4/29/2021	7/1/2021	9/2/2021	11/4/2021
	Open	10/8/2020	12/17/2020	3/4/2021	5/6/2021	7/8/2021	9/9/2021	11/11/2021
K6RJM	Rob McNicholas	10/15/202	1/7/2021	3/11/2021	5/13/2021	7/15/2021	9/16/2021	11/18/2021
KE6HCE	Armando Picciotto	10/22/202	1/14/2021	3/18/2021	5/20/2021	7/22/2021	9/23/2021	12/2/2021
NI6A	Don Simon	10/29/202	1/21/2021	3/25/2021	5/27/2021	7/29/2021	9/30/2021	12/9/2021
KM6TCB	Dave Roth	11/5/2020	1/28/2021	4/1/2021	6/3/2021	8/5/2021	10/7/2021	12/16/2021
KK6ZPM	Karen Fenton-Leong	11/12/202	2/4/2021	4/8/2021	6/10/2021	8/12/2021	10/14/2021	12/23/2021

### Thursday Net Training Exercises

Following the net check-ins every Thursday at 1900 on 146.415, KARO ECHO usually runs a training exercise to learn and practice skills that are important for successful disaster communications.

[A list of potential training exercises](#) is posted and maintained on the training page of the website.

[Our weekly net check-in counts for 2020](#) are up strongly. Recently we have been averaging 24 check-ins per week, with the current record high of 28 check-ins on Oct 29. In past years we averaged 14-15/week. A total of 72 unique callsigns have checked in to the net this year, and after the coming Dec 17th net, we will have **recorded over 1000 check-ins for the year** (up significantly from 609 and 743 the previous two years). Overall, it is great to see that more operators are active. Thanks for your participation. Keep it up!

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## About KARO ECHO

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KARO ECHO is the name of the Kensington Amateur Radio Operators and the El Cerrito Ham Operators mutual benefit association, an all-volunteer non-profit group of amateur radio operators providing auxiliary communications for the cities of Kensington and El Cerrito in the event of a disaster. KARO ECHO works with CERT (Community Emergency Response Teams) in Kensington and El Cerrito, but is not an official part of the CERT program.

Monthly in-person meetings of KARO ECHO are on the 2nd Monday of each month at 7:00 pm at the Arlington Park Clubhouse, 1120 Arlington Blvd, El Cerrito, CA. The next meetings are:

- ◆ Dec 14<sup>th</sup>, 2020
- ◆ Jan 11<sup>th</sup>, 2020

Yearly membership dues are \$30/year for individuals, \$40/year for a family membership. Payments can be given to the Treasurer at monthly meetings or mailed to the address below. Participation is welcome independent of paid membership, but only licensed amateur radio operators who are dues paying KARO ECHO members will be allowed to vote on KARO ECHO business. Dues cover our 510c3 registration, post office box, web page, station operating manuals and more. Your input on useful expenditures to aid emergency communications is welcome.

Mail to: KARO ECHO, PO Box 2025, 6324 Fairmont Ave, El Cerrito, CA 94530-3651

Please see our website for more information: [www.karoecho.net](http://www.karoecho.net)

You can contact the KARO ECHO board by email: [info@karoecho.net](mailto:info@karoecho.net)

### KARO ECHO Facebook

The [KARO ECHO Group on Facebook](#) has a lot of good information, more than is contained on our website. There is a whole wide world of emergency communications information at <https://www.facebook.com/groups/1451216838315743/> Check it out and be inspired of what we can do to help disaster victims in our community.

### Weekly Training Net

The Karo-Echo Weekly Training Net meets every Thursday evening immediately after the West Co Co County RACES/ACS Net; but not before 1900 on 146.415 MHz Simplex. Details at <https://www.karoecho.net/events>

### KARO-ECHO Frequencies

The KARO ECHO primary frequency is 146.415 MHz simplex. Our secondary frequency is 146.475 MHz simplex, a 60 KHz spread between operating frequencies reduces adjacent frequency interference.

### Newsletter Content Wanted

Any input on content you'd like to propose for inclusion in the KARO ECHO newsletter can be sent to Howdy [ke6bee@arrl.net](mailto:ke6bee@arrl.net) We welcome all ideas for content including announcements, events, etc.

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## Outreach, Education and Licensing

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### Training for Beginning Operators

Thanks to Jay KJ6WSS, Edward KM6UBY and Karen KK6ZPM for their May 23rd introductory radio class, with emphasis on the GMRS radio BTECH-V1. [A recording of the class and other resources are available here.](#)

### Net Control Operator Training

Diane KK6RED, David KJ6AAT and Howdy KE6BEE taught an Apr 4th net control class for C8 the county wide CERT organization. There was a great reception to this class across the county and we inspired many groups to expand the scope of their net trainings. [The class recording is available here.](#)

### EMCOMM related videos

See the CERT SET Youtube video link

<https://www.youtube.com/watch?v=66DdgGLIn4c&list=PLROOaUIKdrEgSID1bQJZojW3PzfURoEY-&index=144&t=0s>

Post Camp Fire GMRS organization

[https://www.youtube.com/watch?time\\_continue=220&v=aZiSC4sgKYw&feature=emb\\_logo](https://www.youtube.com/watch?time_continue=220&v=aZiSC4sgKYw&feature=emb_logo)

### ELMERING

An online elmering forum can be accessed by emailing [elmer@karoecho.net](mailto:elmer@karoecho.net) or browsing the associated google group. More in-depth elmering/mentoring is available by request.

In the meanwhile, please check out the plethora of useful information at <https://www.karoecho.net> website.

### Encouragement to Monitor 146.415 and Explore Other Nets

During the current shelter in place, with time spent at home, it is a good opportunity to use your radio and monitor 146.415 (call out for others occasionally and make some casual contacts). There are a lot of other nets around the bay area that you can reach. Expand your radio horizons. See the [KARO ECHO Coordination page](#) for a listing of some other nets to explore. You can just listen at first, or program your radio (if a repeater is used) and try transmitting as a guest check-in to see if you can make contact.

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## KAROECHO.Net Website

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Especially, check out the EVENTS Page ( <https://www.karoecho.net/events> ) and the WORKSTREAMS drop-down menu which will lead one to an extensive training page that provides online learning at your own pace. Everything from the very beginning to advanced EmComm operations is detailed. The RESOURCE page has many excellent outside links.

- ♦ If you are on Facebook, contribute to the KARO ECHO Facebook Group Page at <https://www.facebook.com/groups/1451216838315743/>
- ♦ If you haven't already filled out the JOIN form please do. Find it as a drop down menu under "Get Involved" See <https://www.karoecho.net/join>
- ♦ A follow-through novice primer has been put on the website for new hams once they have bought their radio and want to learn more. See: <https://drive.google.com/file/d/10J-569BRrx5adhA-hJGPeNITU6B9Yi6z/view>
- ♦ Also a new Dual-Band antenna primer for new hams who want to graduate from the rubber-duffy world is at [https://drive.google.com/file/d/1u\\_ozABBRYDJDACFJRTV\\_rxWF1WjCgW\\_I/view](https://drive.google.com/file/d/1u_ozABBRYDJDACFJRTV_rxWF1WjCgW_I/view)
- ♦ Note that the Tram 1480 gain dual band antenna is currently still available for \$51 (no tax and free shipping) on ebay or from Home Depot. That and an inexpensive speaker tripod is a dynamite combination for portable operation. This antenna is equivalent to the Diamond X-200a antenna which sells at HRO for \$125.00 before taxes and shipping.
- ♦ For newbies, please visit <https://www.karoecho.net/workstreams/training> and read the study materials. It is all there except for hands-on experience. Ask questions!
- ♦ Following the Thursday evening net check-in, there is often a training session and/or discussion.
- ♦ All recent KARO ECHO **Minutes will be found at our Past Events page** We are now including past Executive Board Minutes as well. [Newsletters are on the Documents Page.](#)

If you desire to be removed from this email list, please email [info@karoecho.net](mailto:info@karoecho.net)

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## Other Resources

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"ALERTWildfire" camera links in our area:

[Wildcat Canyon cam](#)

[Vollmer Peak cam](#)

[Nichol Knob cam](#)

[View real-time data from any weather station in the state.](#)

[Albany Radio Groups.io forum](#)

[Eastbay Resilience Groups.io forum](#)

[Marina Bay Neighbors and 1st Wed West county GMRS net](#)



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## Digital Modes for Emergency Communications

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Analog voice radio communication (particularly FM on VHF and UHF bands) is the prevailing choice in local volunteer emergency communications for good reason. The gear is relatively inexpensive, simple and reliable. KARO ECHO has trained to efficiently pass messages using analog voice equipment and there is a critical mass of users of this platform. However, there are other modes of operation and technology (in particular digital modes) that have great promise to aid emergency communication and improve performance over that of traditional voice operations, and it is worth exploring the development of these communication tools in addition to analog voice. This introduction is offered as a starting place to discuss whether KARO ECHO membership is interested in building group capacity in digital modes.

### Digital voice:

There are [three prevailing digital voice standards](#) in ham radio: DMR, D-star and Fusion. Unfortunately, the multiple standards lead to fragmentation and it is unlikely to have all, or most, operators in a group outfitted for a particular system without some coordination effort. DMR is not as user friendly to program, but it is an open standard and has the most radio offerings, particularly at an entry level price point (below \$100). It is most likely the club would have to coordinate and program most members radios for DMR. D-star is predominantly offered on Icom radios, but it is also an open standard and is offered by some other manufacturers. However, D-star tends to be available on radios at a higher price point \$300+. It is more user friendly to program than DMR (simplex D-star can be easily setup at the radio interface similar to VFO/Frequency mode on a traditional analog radio). Fusion is proprietary and only available on Yaesu radios. For this reason it is least likely to be adopted for emergency communications across a broad user base. DMR seems to be the best positioned to be used for emergency communications, because of the number and price point of DMR radios, but it takes regional coordination to grow the user base and help get everyone programmed to work together. Most digital voice use includes the worldwide linked repeater network aspect of these modes, but that may not be the most relevant use for emergency communications, because it relies on working internet infrastructure. Simplex digital voice is also useful. Although, local radio links may reach far enough to get to a part of the system that still has operational internet for a wider reach.

### Why use Digital voice?

- Narrow use of spectrum and not as susceptible to adjacent transmission conflict (more throughput)
- DMR can be retrofitted on a single existing analog repeater to provide 2 voice channels (with analog fallback option)
- Cleaner copy at low power up to the point of dropping out, analog has a gradual falloff in quality for weaker signals and needs more power to achieve similar results.
- Some additional text data exchange is possible
- Operationally similar to analog voice
- All functionality built into radio, no connection or interfacing of multiple pieces of equipment necessary

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## Digital Modes for Emergency Communications *(continued)*

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### Traditional packet radio and APRS:

Packet radio uses the same analog VHF/UHF radios typically used by KARO ECHO operators, but digital data is encoded over the air using audio frequency-shift keying ([AFSK](#)) where two distinct frequency tones are selected to represent the two digital logic levels. 1200Hz is transmitted for the mark (one) and 2200Hz is transmitted for the space (zero). The data rate is typically 1200 baud (or bits per second), sometimes as high as 9600 baud. The data link layer or formatting of the packet data is the [AX.25 protocol](#). A data checksum (CRC) is used to identify errors and get corrupted portions of a transmission resent. FX.25 a variant with forward error correction is also used (redundant information is sent proactively to anticipate some data loss).

While the radio used can be a typical analog FM radio, there needs to be an interface between the computer and the radio that turns the digital information into the analog audio tones that the radio can transmit. This is essentially like a MODEM (modulator-demodulator) that you might be familiar with from the dial-up days of computer networking, but it is typically called a TNC (terminal node controller) in packet radio. While this is usually a dedicated piece of hardware that sits between your computer and radio (with the necessary interface cables connected to mic and speaker lines of the radio), the same function can also be accomplished with the right software (such as [Direwolf](#)) and a suitable computer audio “card” (the general purpose built-in, or USB add-on, audio interface to the computer).

With a dedicated central radio and computer a bulletin board service (BBS) can be operated that allows accessing messages after they are originally sent (“store and forward”). Such systems can also be linked to other bands or networks (HF, internet, etc.)

The GPS location data reported over radio using Automatic Packet Reporting System ([APRS](#)) is another example of packet radio digital communications. An extensive world wide network has been established with radio links and digipeaters on 144.39 (North American APRS freq.), as well as internet links. [APRS.fi](#) provides a real-time and historical map of reporting APRS stations.

While there may be parts of the system impacted by disaster events, there is some resiliency (redundancy) and it is quite possible to use this communication resource locally, without much infrastructure, to convey locations of resources and pass simple text messages. APRS reporting and viewing function is built-in to many handheld ham radios and can be added with simple tools to others such as the [Mobilinkd device](#) that connects to your radio and provides a wireless digital communication link to your cell phone as the user interface.





## Digital Modes for Emergency Communications *(continued)*

### Other digital modulation options (FLdigi):

Fast light digital (or [FLdigi](#)) is a popular piece of software with a variety of digital modulation options for ham radio on a wide range of bands including HF/VHF/UHF, etc. There are plenty of other software options that allow using the same digital modulation protocols as FLdigi. Many of these are modulation techniques are used with single side band (SSB), particularly on HF, but for the purposes of this discussion, the focus will be FM on VHF/UHF.

Thanks to its highly redundant Forward Error Correction (FEC) MT63-2000L (also called MT63-2kL) is a very robust, but slow digital mode at 20 Baud (~200 words/min), 1/60 the speed of traditional packet and maybe 5x faster than an expert morse code operator. One advantage of this mode is that it can be used with audio coupling between the data source and the radio (basically holding your radio mic/speaker up to the computer or cell phone mic/speaker generating or listening to the audio). While this isn't the most convenient or reliable methods of digital communication, it does require less hardware interfacing between the computer and radio. In Contra Costa County there is a weekly digital net on the Mt. Diablo repeater [W6CX](#) (Tues. at 8pm on 147.060 MHz) that uses MT63-2000L as the default mode and often switches to faster modes, as well. Some west county operators can reach this repeater and participate on this net, tune in and see if you can hear it.

8PSK modes offer higher speeds. 8PSK-500F can achieve data rates of 1000 bits/sec and 8PSK-1200F is 2400 bits/sec (both have forward error correction), putting this mode at about the same level of performance as traditional packet.

Of particular interest to emergency communications is the integration of [NBEMS](#) (Narrow Band Emergency Messaging Software) and the companion program FL message ([FLmsg](#)). This messaging software builds on FLdigi to provide nicely formatted forms that are used by hams in emergency communications including the ICS-213 and the ARRL Radiogram which is similar to the KARO ECHO modified ICS-213.

While primarily used as a weak signal mode on HF/SSB, [JS8Call](#) can be used on FM VHF/UHF with the sacrifice of weak signal performance, as a conversational text communication platform. Some ham groups have explored using this for emergency communications, but it is not designed with that use in mind.



